Glossary: Definitions of relevancy for the "flux concept" in ozone risk assessment

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The following definitions have been formulated with reference, in particular, to Musselman et al. (2006; see below):

1) **Concentration** [mol m^{-3}]: Molar density of ozone or the number of moles of ozone per unit volume of air. Concentration is sometime expressed as a mixing ratio of mass (or volume) of ozone per mass (or volume) of air, in units of ppm, ppb, or nl l^{-1}.

2) **Exposure** [mol m^{-3} h]: Product of the instantaneous ozone concentration in the vicinity of the vegetation times duration of the presence of ozone, i.e. integral of ozone concentration in the ambient air over time. Seasonal or daily averages of the instantaneous ozone concentration have been referred to as exposure indices. The term 'plant-external ozone dose' has been used, but the term is inaccurate and should be omitted. Exposure is sometimes expressed in mixing ratio units, ppb h; ppm h.

3) **Surface ozone flux** [nmol m^{-2} s^{-1}]: Transfer of ozone per unit of ground surface area from the ambient air to plant surfaces (including non-stomatal leaf surfaces and stomata) and non-plant surfaces (e.g. soil, water, snow/ice, other materials). "Total ozone uptake" has been used as a synonym - however, this expression is inaccurate and should be omitted for clarity. Rather, this parameter represents the "rate of ozone deposition" towards surface areas (see 9).

4) **Stomatal flux (or uptake rate)** [nmol m^{-2} s^{-1}]: Instantaneous rate of ozone transfer per unit of leaf or ground surface area through stomata into the sub-stomatal cavity of leaves, i.e. the passage of ozone molecules (moles) into leaves; a temporally dynamic measure of the rate of ozone, which enters the leaf via the stomata.
This stomatal flux is defined per unit ground surface area because measurements and modelling of ozone flux use per unit of ground area. However, it is recognized that stomatal flux estimated per unit area of leaf surface is more physiologically appropriate.

5) **Stomatal uptake** [mmol m^{-2}]: Cumulative stomatal ozone flux or uptake rate of ozone over a period of time (e.g. day, season, year), i.e. amount of ozone molecules (moles) passing through the stomata into leaves during a specific time period. Hence, the amount of ozone taken up over time represents the physiologically relevant ozone dose (see 8) or "intake" of ozone (*sensu* medical definitions).

6) **Stomatal dose** [mmol m^{-2}]: synonymous to (5); integral of the stomatal ozone flux or uptake rate of ozone over a period of time (e.g. day, season, year), i.e. the amount of ozone (moles) passing through the stomata into leaves during a specific time period (represents the physiologically relevant ozone "intake" *sensu* medical definitions).

7) **Effective stomatal ozone flux (or uptake rate)** [nmol m^{-2} s^{-1}]: the equivalent of the instantaneous rate of ozone transfer per unit of leaf or ground surface area through stomata into the sub-stomatal cavity of leaves that may affect the plant's metabolism, i.e. resulting from the difference between stomatal flux and the rate of ozone detoxification by the plant's internal processes. The flux/detoxification balance determines the ozone available to initiate further plant metabolic processes.

8) **Effective dose** [nmol m^{-2}]: The integrated effective flux or uptake rate of ozone (see 7) over time (represents the equivalent of ozone "intake" *sensu* medical definitions that may affect the plant's metabolism).

9) **Deposition** [nmol m^{-2}]: cumulative amount of ozone deposited per unit of (ground) surface area over a specific period of time (linking processes of surface ozone flux to those of ozone adsorption (see 10).

10) **Adsorption** [nmol m^{-2}]: ozone deposition onto (and decomposition of ozone on) external plant surfaces (e.g. of leaves, stems, branches) or non-plant surfaces over a specific period of time.

11) **Absorption** [nmol m^{-2}]: ozone deposition through stomata into the leaf intercellular air spaces over a specific period of time.

Compiled in agreement with:

Matyssek R., Reich P., Oren R., Winner W.E. 1995. Response mechanisms of conifers to air pollutatns. In: Smith W.K., Hinckley T.M. (Eds.): Ecophysiology of coniferous forests. Academic Press, San Diego, CA, pp.255-308.

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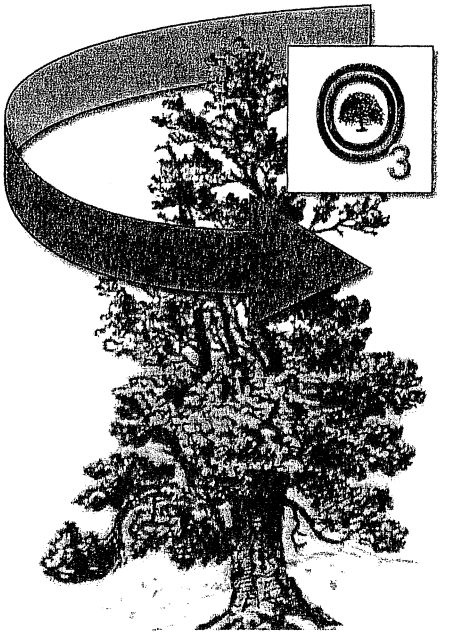
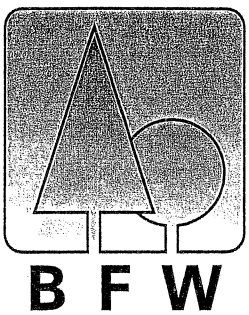


Proceedings on the workshop

"Critical Levels of Ozone: Further Applying and Developing the Flux-based Concept"

15-19 November 2005
Obergurgl, Tyrol, Austria

Editors
Gerhard Wieser, Michael Tausz



ISBN 3-901347-65-8

Editors:
Gerhard Wieser, Michael Tausz

Layout and printing:
Federal Research and Training Centre for Forests,
Natural Hazards and Landscape (BFW)
Seckendorff-Gudent Weg 8, 1131 Vienna, Austria
URL: http://bfw.ac.at

Available from:
Federal Research and Training Centre for Forests,
Natural Hazards and Landscape (BFW) - Bibliothek
Seckendorff-Gudent Weg 8, 1131 Vienna, Austria
Tel. + 43-1-878 38 1216, Fax. + 43-1-878 38 1250
E-Mail: gudrun.csikos@bfw.gv.at
Online Bestellungen: http://bfw.ac.at/db/bibliothek_publikationen.bestellung

Price:
38,--Euro
plus mailing costs (Europe)